AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions and listings of claims in the application:

1-27. (Cancelled)

28. (Currently Amended) ~~An apparatus~~ A process for controlling blood flow in an extracorporeal blood circuit, wherein said extracorporeal blood circuit ~~having~~ has at least one blood treatment unit, at least one access branch extending between a blood collection area, where blood is collected from a patient, and the at least one blood treatment unit, at least one peristaltic pump associated for operation with said access branch of the extracorporeal blood circuit, and at least one return branch extending between the at least one blood treatment unit and a blood return area, where the blood is returned to the patient, said ~~equipment~~ process comprising the steps of:

~~at least an arterial pressure sensor, configured to measure~~ measuring an arterial pressure in a portion of said at least one access branch upstream of the at least one peristaltic pump and ~~to generate~~ generating a corresponding first output signal proportional to said arterial pressure;

~~at least an angular velocity sensor, configured to measure~~ measuring an angular velocity of the at least one peristaltic pump and ~~to generate~~ generating a corresponding second output signal proportional to the angular velocity of said at least one peristaltic pump;

~~a memory configured to store~~ storing in a memory at least one set flow value of a desired blood flow through said access branch, said measured values of

arterial pressure and angular velocity, and a calibration function in accordance with at least the following variables:

v1, related to the angular velocity of the pump;

v2, related to the arterial pressure in the portion of said at least one access branch upstream of the at least one peristaltic pump; and

v3, related to an actual flow of blood through said at least one access branch; and

~~at least one control unit, operatively coupled to said arterial pressure sensor, said angular velocity sensor, and to said memory, configured to receive said first and second output signals and to store corresponding measured values of arterial pressure and angular velocity in said memory, said control unit being configured to~~ ~~execute~~ executing a control procedure comprising the following sequential operations:

calculating an actual flow value by applying said calibration function to the corresponding measured values of arterial pressure and angular velocity ~~measured with said arterial pressure sensor and said angular velocity sensor~~;

comparing said actual flow value with said at least one set flow value; and

comparing the angular velocity with an acceptable maximum angular velocity value which can be imparted to the at least one peristaltic pump; and

varying the angular velocity of said at least one peristaltic pump if the difference between the actual flow and the desired blood flow lies outside a predetermined range.

29. (Currently Amended) ~~An apparatus~~ A process according to claim 28, further comprising the step of ~~a timer device operatively coupled to the control unit, said~~

~~control unit being capable of~~ executing said control procedure at predetermined time intervals.

30-32. (Cancelled)

33. (Currently Amended) ~~An apparatus~~ A process according to claim 28, wherein said control procedure further comprises a step of verifying a stability of said arterial pressure.

34. (Currently Amended) ~~An apparatus~~ A process according to claim 33, wherein the step of verifying a stability of said arterial pressure further comprises the steps of:

measuring a first arterial pressure at a predetermined time,

measuring a second arterial pressure after said predetermined time, and

comparing a difference between the first and second arterial pressures with a predetermined range of acceptability, waiting for a predetermined time interval and repeating said steps of measuring and said step of comparing, and continuing said control procedure if the difference between the first and second arterial pressures lies within said predetermined range of acceptability.

35. (Currently Amended) An apparatus according to claim 33, wherein said step of verifying a stability of the arterial pressure is executed before said step of calculating an actual flow.

36. (Cancelled)

37. (Currently Amended) An apparatus according to claim ~~36~~ 28, wherein, after said step of comparing said actual flow value with said set flow value, and before said step of varying the angular velocity of said at least one peristaltic pump, said

control procedure including a step of comparing the arterial pressure with a threshold value considered critical for a patient being treated, and, if the arterial pressure is below the threshold value, an exit is made from an algorithm and an operator is alerted by means of a warning message relating to an occurrence of a limit pressure condition.

38. (Cancelled)

39. (Currently Amdended) ~~An apparatus~~ A process according to claim 28, wherein the calibration function is further based upon:

variable v4, related to a time elapsed from a start condition of said control procedure,

said ~~control unit being configured to determine~~ process further comprising a step of determining a time elapsed between said start condition and each instant in which said control procedure is executed, and of calculating an actual flow value by applying said calibration function to a value of said time elapsed and to the corresponding measured values of arterial pressure and angular velocity ~~measured by means of at least said arterial pressure sensor and said angular velocity sensor~~.

40. (Currently Amended) ~~An apparatus~~ A process according to claim 28, wherein

$$v3 = \left[\sum_{i=0\ldots n} a_i \bullet (v2)^{n-i} \bullet (v1)^i\right] + C,$$

where a_i and C are experimentally determined known parameters.

41. (Currently Amended) ~~An apparatus~~ A process according to claim 39, wherein $v3 = \left[\sum_{i=0\ldots n} \sum_{k=0\ldots m} a_i \bullet b_k \bullet (v2)^{n-i-k} \bullet)(v1)^i \bullet (v4)^k\right] + C,$

where a_i, b_k and C are experimentally determined known parameters.

42. (Currently Amended) ~~An apparatus~~ A process according to claim 40, wherein

$v3 = a \bullet v1 + b \bullet v1 \bullet v2 + c \bullet v2 + d$,

where a, b, c, and d are experimentally determined known parameters.

43. (Currently Amended) ~~An apparatus~~ A process according to claim 41, wherein

$v3 = (a \bullet v1 + b \bullet v1 \bullet v2 + c \bullet v2 + d) \bullet f(v4)$,

where a, b, c, and d are experimentally determined known parameters and f(v4) is a function which is also known and experimentally determined in a variable v4.

44. (Currently Amended) ~~An apparatus~~ A process according to claim 28, ~~wherein said memory is designed to store~~ further comprising the step of storing a plurality of calibration functions, each calibration function being based upon at least variables v1, v2, and v3, and each calibration function being applicable to a corresponding one of a plurality of types of extracorporeal circuits.

45. (Currently Amended) ~~An apparatus~~ A process according to claim 44, wherein each of said calibration functions is also a function of a variable v4, related to a time elapsed from a start condition of said control procedure.

46. (Currently Amended) ~~An apparatus~~ A process according to claim 45, wherein each of said calibration functions is further a function of variables:

v5, related to geometrical characteristics of an access member connectable for operation to said extracorporeal blood circuit; and

v6, related to a length of a portion of a tube of the at least one access branch upstream of said at least one peristaltic pump.

47. (Cancelled) ~~An apparatus~~ A process according to claim 46, wherein said calibration function comprises two functions linked together with continuity, the first function being valid in a first range of values of arterial pressure, and the second function being valid in a second range of values of arterial pressure following said first range.

48-54. (Cancelled)